Information Management Efficiency in Universities in Northern Nigeria: An Analysis

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This study examines whether or not information management in Nigerian universities is efficient. It used multistage sampling technique to select fifteen (15) universities drawn from a population of forty four (44) universities across the three geo-political zones in the north on the basis of ratio 1:3 in each stratum of Federal, State and Private universities respectively. Using questionnaire with interview guide, the study elicited data from two groups of respondents; 'Information Providers' and 'Information Users' to determine the Information Management Efficiency in the universities. Data were analysed with descriptive statistics, Pearson Chi-Square and One-Sample-t-Test statistics. The study found that information resources are not efficiently managed, because the universities were found deficient in terms of generating timely information, poor utilisation of MIS capacity and high cost of generating piece of information. It recommends among others the need to engage qualified staff to man MIS units in the universities. It also recommends full automation of MIS units and adoption of multiple information management strategies to improve information management efficiency in the universities.

Keywords: Management, information, MIS Capacity, efficiency, universities

1. Introduction

Information management provides excellent means whereby management and users access information for decision making in an organisation. One of the central points in information management is efficiency. An efficient 'information management system' creates, processes and disseminates information that is critical to organisational performance. It ensures that information is available to the managers and other users in the form they want it and when they need it. This is why timely information is particularly central to effective decision making in an organisation.

Similarly, a good information management uses information technology (IT) to automate information management processes. Automation improvements decrease the number of personnel required and improve economies of scale, make proper utilisation of MIS capacity and reduce the overall cost for academic activities and other service deliveries. In this manner, information technology enables universities to operate efficiently with an overwhelming positive effect on the financial goals of management and other stakeholders in the university system.

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Indeed, a university information system links all the components of the university such as personnel, admissions, exams and records, bursary, library, sickbay, students affairs unit, security and management among others. It permeates all the components.

Efficient information management helps an organisation to cope with challenges, because it guarantees the capacity to produce information that is timely, accurate and reliable. It is therefore, the bedrock of organisational performance. Popoola (2000) argues that information and records management are the bedrock of business activities. In the context of university, efficient information management provides a framework for keeping, maintaining and providing for the disposition of information for managerial decisions. It gives benefits to the management by facilitating continuity in the administrative function in the face of lean resources.

However, evidence points to the fact that management information systems in some tertiary institutions in some parts of Nigeria are not efficient. For instance, Popoola and Oluwole (2007) posited that Nigerian university administrators are often concerned about the alarming rate of misplacement or loss of vital records and the slow speed at which needed records are retrieved from storage. Similarly, Atulomah (2011) and Ugwunze (1992) observed that universities in Nigeria generate large quantity and quality records in their day-to-day activities; but a lot of files are duplicated in numbers within and across units without control over their creation, causing data redundancy and wasteful spending.

On the account of these problems, research questions were posed, such as: Do universities generate timely information? Are MIS capacity efficiently utilised? DO universities generate cost effective information?

Thus, this study was provoked to investigate the efficiency of management information systems in universities in the Northern Nigeria. Its main objective is to examine whether or not, information management system in these universities is efficient. It is set specifically to:

1. Examine whether or not universities generate timely information;
2. Find out if information systems in Nigerian universities lack efficiency in terms of MIS capacity utilisation; and,
3. Find out if the cost of generating information in the Universities is efficient

This study unlike the prior ones contributes to the body of management literature by underscoring the information management efficiency in terms of timeliness, capacity utilisation, cost and suggesting ways of improving the current state of information management in Nigerian universities.

The paper is divided into six parts. The first part is this brief introduction and the subsequent parts deal with literature review, methodology, data presentation and analysis, results and discussions, conclusion and recommendations.

2. Literature Review

A number of studies have been carried out on MIS in higher educational institutions in Nigeria, particularly the University system. The scope of these studies largely focused on adoption, uses and constraints of MIS and ICT tools.

For instance, Ifinedo and Uwadia (2005) discussed the risks in the collaborative development of an MIS application by Nigerian universities; using observation, interviews and 'Kendall's *W* coefficient of concordance' at the level 0.833, to present its findings. The findings indicate that; funding of the project, top administrators' commitment as well as the Technical complexity and team expertise are among the topmost risks. The implication of the study is that, the NUMIS project was a partial success in so far as it did not meet all its set objectives. Similarly, Uwadia *et al* (2006) also studied the risk factors associated with the collaborative development of information systems (IS) within the University environment in Nigeria. They used observations and reviews of relevant reports of the project as well as a variation of the Delphi model in presenting their findings. The study shows that risks were associated with funding, top administrators' commitment, the number of participating universities, and users' support among others.

Similarly, Sani and Tiamiyu (2005) evaluated the status of automated information services in selected Nigerian universities with a view to identifying progress and prospects of, and constraints to the technological transformation of Nigerian universities. Using descriptive statistics, the study found that automated services were far from adequate and that, out of the 29 different automated services that one would expect in a modern university, only about 40(%) per cent were available. The study also revealed that universities differ on the level of automation and utilisation; that only the federal universities benefited from the implementation of four major automated services projects, namely, NUMIS, NUNet, CAS (accounting) and the TINLIB (library) applications. The study outlined major obstacles militating against the automated services in the universities, such as; inadequate funds, electricity supply and telecommunications connectivity, as well as inadequate human resources for the automated systems. The study of Adebayo (2007), Deba *et al* (2007), Asogwa (2004), Uwaifo (2004) and Ebinero (2002) share the views above.

Ajayi and Omirin (2007) investigated the use of Management Information Systems (MIS) in decision-making on long-term planning, short-term planning and budgeting in the South-West Nigerian Universities. Their study used the descriptive research design of the survey type. Data were collected from a sample of 600 subjects consisting of 400 academic staff holding administrative staff positions and 200 senior administrative staff heading units using stratified random sampling technique. Data collected were analysed using frequency counts, percentages, means, standard deviation and t-test statistics. The three hypotheses generated were tested at 0.05 level of significance. The study revealed that MIS was not adequately used in decision making process on long-term planning, short-term planning and budgeting. There was no significant difference between Federal and State universities in terms of the use of MIS for decision making on both long and short term planning. But there was significant difference in the use of MIS for decision making on budgeting between Federal and State universities in favour of the Federal universities. It was recommended that the MIS units should be adequately financed and maintained to ensure a free flow of information and adequate use of MIS in decision-making on short term and long-term planning as well as budgeting.

Beside these studies, some evidence also points to the fact that information management in Nigeria Universities is yet to attain the level of efficiency in the face of global reality. Popoola and Oluwole (2007) posited that Nigerian university administrators are often concerned about the alarming rate of misplacement or loss of

vital records and the slow speed at which needed records are retrieved from their storage. Similarly, Atulomah (2011) observed that Universities in Nigeria generate large quantity and quality records in their day-to-day activities; but a lot of files are duplicated in numbers within and across units without control over their creation, causing data redundancy and wasteful spending.

The explanatory reasons often given for these challenges have been put around the fact that development of MIS in Africa is constrained by lack of infrastructure and untrained personnel to handle equipment (Okwilagwe and Njoku, 2002). Fabunmi and Isah (2004) identified inadequate personnel quantity and quality, lack of basic infrastructure as requirements for attaining efficiency in MIS activities at the tertiary education level. In addition, Ahmed (2009) also identified poor infrastructure, undefined policy gap and poor awareness. Fabunmi and Isah (2004) also observed that Nigerian tertiary institutions have information generating capacity of 76% and utilisation capacity of 3%. These facts amongst others show the inability of most educational institutions in Nigeria to put up sound information management policies to guide the generation, processing, storage and retrieval of information. This constitutes the major problem which culminates in resources underutilisation and poor information management.

As plausible as these reasons, they have not had empirical support from the universities in the Northern Nigeria which is the purview of this study. An extensive literature search has shown that no research had been undertaken to show how universities in the Northern Nigeria have been managing their information and the challenges faced. Suffice to say therefore, that a gap exists in knowledge as these studies failed to examine the operating efficiency of MIS in universities in Northern Nigeria. It is against this backdrop that this study investigates the information management efficiency in selected universities in Northern Nigeria. This study however, takes a slightly divergent approach from the earlier studies in this stream. It measures efficiency of information management using three criteria namely; timeliness of information accessibility, capacity utilisation efficiency and cost efficiency of generating information. In addition, it combined a number of data analysis techniques which studies in this stream did not use. These are descriptive and inferential statistics such as frequency distributions, cross tabulation, Pearson Chi-Square and One-Sample-t-Test.

3. Research Methodology

The study adopts survey design because data were collected at once and the variables were not manipulated. It identified the key determinants of information management efficiency i.e. dependent variable which include; information timeliness, capacity utilisation and cost of generating information and the independent variable proxied by MIS capacity and qualified manpower. The survey was carried out within a period of six (6) months and covered the study population; that is, two (2) months in each of the three geo-political zone in Nigeria.

The population of this study comprises of all the forty four (44) universities in Northern Nigeria. The population frame includes eighteen (18) Federal Universities, fifteen (15) state universities and eleven (11) Private Universities, currently in the National University Commission (NUC), list of registered universities in Nigeria (NUC, 2011).

The justification for this sample size is fair representation of various types of universities in Nigeria.

The study used multistage sampling technique comprising of stratified sampling used in grouping the universities into Federal, State and Private strata; random sampling technique used to select fifteen (15) universities drawn from a population of forty four (44) universities across the three geo-political zones in the north, on the basis of ratio 1:3 in each stratum of Federal, State and Private universities respectively; and purposive sampling to administer questionnaire. The study elicited data from two groups of respondents; 'Information Providers' and 'Information Users' to determine the Information Management Efficiency in the universities. Table 1 below shows the number of sampled universities in each stratum.

Table 1: Population Distribution and Sample size

Zones	Federal Universities		State Universities		Private Universities		Total/ Zones	Sample size/ Zones
	No. of Univ.	Sample size	No. of Univ.	Sample size	No. of Univ.	Sample size		
N/Central	7	**2**	6	**2**	8	**3**	21	**7**
N/East	5	**2**	4	**1**	2	**1**	11	**4**
N/West	6	**2**	5	**2**	1	**0**	12	**4**
Total	18	**6**	15	**5**	11	**4**		**15**

Source: *NUC Monday Bulletin 22 August, 2011: Vol.6No.34*

The main hypothesis tested in this paper is:

H0: "Information management in universities in the Northern Nigeria lacks efficiency'

The determinants of the dependent variable were derived from data reported in the 300 copies of the questionnaire retrieved valid for this analysis. The benchmark was based on the sample mean and range as presented in table 2. Thus, Data source namely, Capacity Utilisation Efficiency (CUE), Time Efficiency (TE) and Cost Efficiency (CE) constitute the determinants of dependent variable and they are proxies of information management efficiency. The independent variable is the MIS capacity. The dependent variable was determined by recoding CUE, TE and CE into a categorical data; that is 'efficiency' or 'inefficiency'. The benchmark for recoding value for the dependent variable is the mean score of the distribution as shown in table 2.

Table 2: Benchmark for Information Management Efficiency

Value	Range	Minimum	Maximum	Mean	Std. Deviation
300	10	4.00	14.00	9.0067	1.85781

Source: *Analysis of Survey Data, 2013*

Table 2 highlights the population mean, standard deviation, minimum score and maximum score. These data were used to recode the outcome of Information Management Efficiency in the universities. The mean of the population is rounded to 9.0, the minimum and maximum values are 4 and 14 respectively. The benchmark adopted for determining whether or not information management is efficient is the mean of the population. Thus, the value above benchmark through the maximum value

is considered 'Efficient Information Management'; whilst the value from the minimum value through the benchmark is considered 'Inefficient Information Management'.

The statistical tools used in analysing data for this study are descriptive statistics such as frequency distributions and cross tabulation. The inferential statistics such as Pearson Chi-Square and One-Sample-t-Test were used to test the hypotheses upon which meaningful conclusions and recommendations were drawn.

4. Data Presentations and Analysis

The results from the descriptive and inferential statistics are presented below and findings are also discussed. The result from Chi-Square test was not strong enough to confirm the null hypothesis H_o. An ad-hoc statistical test (i.e. one sample t-test) was used to confirm the hypothesis on the efficiency of information management in the universities at 95% significance level. There are a total of three hundred (300) copies of questionnaire administered in fifteen sampled universities at twenty (20) per university.

Table 3: Frequency Distribution for Capacity Utilisation Efficiency

Observations	Frequency	Percentage	Cumulative Percentage
Inefficiency	240	80%	80%
Efficiency	60	20%	100%
Total	300	100%	

Source: *Analysis of Survey Data, 2013*

Table 3 presents the results of the efficiency test for MIS capacity utilisation. A total of 240 respondents rating 80% agreed that MIS capacity is not efficiently utilised, while 60 respondents rating 20% agreed that MIS capacity is utilised efficiently. This finding is consistent with prior studies of Fabunmi and Isah (2004) and (Okwilagwe and Njoku, 2002); who pointed out that MIS lacks trained personnel to efficiently handle information processing equipment in Nigeria.

Table 4: **Frequency Distribution for Time Efficiency**

Observations	Frequency	Percentage	Cumulative Percentage
Inefficiency	217	72%	72%
Efficiency	83	28%	100%
Total	300	100%	

Source: *Analysis of Survey Data, 2013*

The figures in Table 4 are the results of the efficiency test on the timeliness of information generated in the universities. A total of 217 respondents rating 72% agreed that information generated lack timeliness, while 83 respondents rating 28% agreed that information generated are timely. This finding is consistent with prior studies such as; Fabunmi and Isah (2004) who argued that the minimum time spent in obtaining transcripts from universities is 3-4weeks.

Table 5: **Frequency Distribution for Cost Efficiency**

Observations	Frequency	Percentage	Cumulative Percentage
Inefficiency	224	75%	75%
Efficiency	60	25%	100%
Total	300	100%	

Source: *Analysis of Survey Data, 201*

Table 5 presents the results of the efficiency test for cost efficiency of generating a piece of information. It shows that total of 224 respondents rating 75% agreed that information generated are not cost efficient, while 76 respondents rating 25% agreed that information generated are cost efficient. This finding is consistent with prior studies such as; Atulomah (2011) and Ugwunze (1992) who observed that a lot of files are duplicated in numbers within and across units without control over their creation, causing data redundancy and wasteful spending.

Table 6: **Cross tabulation of Responses / Respondents Type**

Respondents	Inefficient Information		Efficient Information	
	Frequency	Percentage	Frequency	Percentage
Technical Staff	101	67.7%	49	32.7%
Users (Staff/Students)	98	65.3%	52	34.7%
Total	199	66.3%	101	33.7%

Source: *Analysis of Survey Data, 2013*

Table 6 presents cross tabulation of Efficient Information Management analysis by respondents' type. The views of the technical staff and users are almost the same, having 67.7% and 65.3% responses for inefficient information managed respectively. Similarly, the responses for efficient information management of the two groups are 32.7% and 34.7% respectively. On the whole, both groups agreed that there is inefficient information management among the universities.

4.1 Results and Discussions

Table 7: Chi-Square Test of Information Management Efficiency

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square (a)	.134	1	.714
Continuity Correction (b)	.060	1	.807
Likelihood Ratio	.134	1	.714
Linear-by-Linear Association	.134	1	.714
No. of Valid Cases	300		

(a). 0 cells (.0%) have expected count less than 5. The minimum expected count is 50.50.   (b). Computed only for a 2x2 table

Source: *Analysis of Survey Data, 2013*

Table 7 presents the result of Pearson Chi-Square analysis on efficiency of information management system in the universities. The footnote (a) indicates that '0 cells (.0%) have expected count less than 5. This means that we have not violated the condition

for validation of Chi-Square test, as all expected cell sizes are greater than 5 (in this case, greater than 50.50).

The value of interest is the Pearson Chi-Square which is 0.134. The test is 2 tail-test (i.e. each variable has only two categories); hence, we used the value in Continuity Correction which compensates for overestimate of the Chi-Square value when used with 2 by 2 table (Pallant, 2007). Therefore, the corrected value is 0.060, with an associated significance level of 0.81 (see column labelled 'Asymp. Sig. (2-sided)'. The probability for rejection or non-rejection is stipulated by the Chi-Square value at $P \leq 0.05$ level of significance (alpha). Our 0.81 is larger than the alpha 0.05, so we conclude that our result is not statistically significant. This means that the proportion of 'technical staff' that said information management is inefficient is not significantly different from the proportion of 'users' who also said that information management is inefficient. This result is consistent with the result of descriptive statistics in Table 6 indicating 66.3% 'inefficiency' and 33.7% 'efficiency'. Based on these facts, we need an ad-hoc statistical test for accepting/rejecting the null hypothesis H_o as presented on table 8.

Table 8: **One Sample-t-Test of Information Management Efficiency**

One-Sample Test	t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Computed Information Management Efficiency	12.319	299	.000	.33667	.2829	.3904

Source: *Analysis of Survey Data*

The use of 'One Sample t-Test' clears the air on the efficiency of information management. The test shows that t = 12.319 with a Mean Difference of 0.33667 at 95% confidence interval. If the Mean Deviation is less or equal to 50 percentile at significant level $P \leq 0.05$, then, we accept the null hypothesis. Since, the test is significant at $P < 0.05$ and the Mean Deviation is 33.67%, we conclude that our result is statistically significant for accepting the null hypothesis (H_o) which states that: '*information management systems in the universities lack efficiency*'. This finding is consistent with views shared by numerous prior studies in relative contexts at one time or the other, such as: Atulomah (2011), Ahmed (2009), Ajayi and Omirin (2007), Popoola and Oluwole (2007) and Adamu (2006) who in their various studies concurred that MIS capacity is central to efficient information management in educational institutions.

5. Conclusions

The broad objective of the study is to examine the efficiency of information management in Nigerian Universities. The intention is to reveal the nature of relationship that exists between the dependent variables (Efficient Information Management) and independent variables (MIS capacity). From the statistical analyses performed and test of hypothesis, the following findings are made:

Evidence from inferential statistical analysis suggests that information management in Nigerian universities generally lack efficiency. This is the major finding as it permeates all the dimensions of the results presented. The specific findings are:

1. MIS capacity is not utilised efficiently
2. There is no timely accessibility to information
3. The cost of generating a piece of information is high.

This study concludes that, Information Resources are not efficiently managed, because the universities were found deficient in terms of generating timely information, poor utilisation of MIS capacity and high cost of generating piece of information.

6. Recommendations

To ensure efficient information management in the Universities, the study recommends the following:

6.1 Improved MIS Capacity: evidence from previous studies mentioned in the analysis section reveals that MIS units are inadequately manned and equipment is fairly adequate. Therefore, there is need to employ qualified ICT professionals to boost the current staff strength of MIS units in the universities. Training of existing staff is imperative. In-house training may reduce cost of training. This will improve the efficiency of information management in Nigerian universities.

6.2 Automation of MIS: The level of automation of information processing system is generally low among the universities visited. Therefore concerted effort is required in this direction to improve on the current level of automation of MIS units in the universities. Establishment of Centralised Data Centre will cut the cost of automation.

6.3 Minimising Cost of Producing Information: An information system strategy is one of the performance predicators of MIS operating efficiency. Rather than relying on one known best 'information system Strategy', this study recommends the use of Multiple Information System strategies in order to meet up with dynamic information demands of the university system in Nigeria. This may be done via collaborations, outsourcing and partnerships with other institutions.

6.4 Further Research: It is the belief of the researchers that this study has made modest contribution to information system management literature and thus, recommends areas of further research. A study on information system management could be further expanded to cover the use of modern information systems in other areas of managerial concern such as; the effective information management in Nigerian universities, impact of MIS on organisational development, MIS and Modern educational training and MIS and Identity management in Nigeria among others.

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